AMENDMENTS TO THE CLAIMS

This listing will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) An electronic driving device for turning on and off a synchronous pump comprising a synchronous electric motor with a permanent-magnet rotor, comprising:

at least a static power switch inserted in series between the motor and an AC electric power supply source; and

a processing unit having at least an input receiving a synchronism signal (V) and a control output connected to said static power switch;

wherein the electronic driving device is controlled by a signal emitted by a float level sensor and includes an input receiving a signal (α) by a position sensor detecting the rotor polarity and position;

wherein the pump turn-on and off is regulated according to the signal emitted by said float level sensor and to a measured difference between a critical load angle (δ), computed in a working condition of the pump in which the signal emitted by the float level sensor corresponds to a high level condition, and a current load angle;

wherein said critical load angle (δ) is a reference value for normal operation of the pump, with no risk of operation under vacuum conditions, and the pump is turned off when the difference between the stored critical load angle and a current mean value of the load angle is greater than a predetermined value.

2. (Previously presented) The device according to claim 1, wherein said position sensor is a Hall-effect sensor.

3. (Previously presented) The device according to claim 1, wherein the motor comprises rotor poles divided by an ideal plane whose rest position is orthogonal to the position of said position sensor.

4. (Previously presented) The device according to claim 1, wherein said float level sensor comprises a Hall probe.

5. (Previously presented) The device according to claim 1, wherein the float of said level sensor is incorporated in an envelope, externally associated with the body of the pump and the sensor element of said level sensor is housed in the pump body in correspondence with said float.

6. (Previously presented) The device according to claim 5, wherein said float is equipped in its lower part with a permanent magnet.

7. (Previously presented) The device according to claim 1, wherein said pump is an immersion pump.

8. (Previously presented) The device according to claim 1, wherein said electronic device is housed on an electronic board positioned inside the pump body in a position just underlying the float level sensor.

9. (Previously presented) The device according to claim 1, wherein the critical and current load angles are obtained from a phase displacement between back electromotive force and said synchronism signal (V), said phase displacement being indirectly measured in said processing unit by detecting the rotor inductance, by means of said position sensor, said rotor inductance being complementary to the back electromotive force.

10. (Previously presented) The device according to claim 1, wherein the pump is immediately turned off if the value of a counter (T2) is greater than a predetermined time limit (Te) defined for an emergency stop.

11. (Previously presented) The device according to claim 1, wherein said critical load angle (δ) is a mean value among N sampled values.

12. (Previously presented) The device according to claim 1, further comprising a first time counter (T1) that is incremented every time instant wherein the float level sensor is low and the pump is off to check the inactivity time period of the pump and turn it on for a predetermined short time period.

13. (New) An electronic driving device for turning on and off a synchronous pump comprising a synchronous electric motor with a permanent-magnet rotor, comprising:

at least a static power switch inserted in series between the motor and an AC electric power supply source; and

a processing unit having at least an input receiving a synchronism signal (V) and a control output connected to said static power switch;

wherein the electronic driving device is controlled by a signal emitted by a float level sensor and includes an input receiving a signal (α) by a position sensor detecting the rotor polarity and position;

wherein the pump turn-on and off is regulated according to a driving algorithm comprising the steps of:

evaluating the high or low position of a float associated to the float level sensor;

if the float level is high storing a critical load angle in a memory unit;

if the float level is low evaluating the difference between the stored critical load angle and a current mean value of the load angle;

if the difference is greater than a predetermined value turn off the pump.